Examining the Influence of Family Support on Diabetes Education Behavioural Outcomes

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Abstract

The purpose of this study was to examine the influence of family support on diabetes education behavioural outcomes, specifically in relation to diet, exercise, and blood glucose monitoring in adult individuals with Type 2 diabetes.

Fifty-three individuals attending diabetes education for the first time were followed approximately 1 month. The findings for the influence of family support were mixed. Family attending diabetes class with participants had a positive influence with respect to diet. This is consistent with Carl Rogers (1969) who espouses setting a positive climate for learning and that learning new attitudes or information comes when external barriers are at a minimum. However family attending class with participants had no influence with respect to exercise or blood glucose monitoring. The family support action of encouraging with respect to diet overall did not influence healthy eating behaviours except for decreased skipped meals and scheduled snacks. In fact, in the areas of family willing to make healthy choices along with participant, the less the family was involved in encouraging, the better the participant did. Exercise on the other hand was influenced positively by family encouragement. This is consistent with Bandura's theory that enhancement of self-confidence and self-efficacy can lead to desired behaviour changes. Family encouragement however did not appear to influence blood glucose monitoring behaviours. This study has implications for practice in that diabetes education programs can encourage family to attend classes or get involved in encouraging the person with diabetes, so that it may help to increase healthy eating behaviours and exercise. As time is necessary to implement changes in behaviour, future research can look at the influence of family support over a 6-month, 1-year, or greater period.

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CHAPTER ONE: INTRODUCTION TO THE PROBLEM

Diabetes Mellitus is a clinical syndrome characterized by inappropriate hyperglycemia caused by a relative or absolute deficiency of insulin or by a resistance to the action of insulin at the cellular level (Haire-Joshu, 1996). The chronic hyperglycemia of diabetes mellitus is associated with damage, dysfunction, and failure of various organs including the eyes, kidneys, nerves, heart, and blood vessels (Meltzer et al., 1998). Diabetes is a very common endocrine disorder that affects over 2 million people in Canada (Meltzer et al.).

Although there is no cure for diabetes at this time, it is possible for a person with diabetes to lead a normal life by adhering to a self-care management regimen. Diabetes education has long been recognized as the cornerstone of the diabetes management regimen (Hurley & Shea, 1992). Diabetes patient education, the process of teaching individuals to manage their diabetes (Peragallo-Dittko, 1995), is recognized by the Canadian Diabetes Association (CDA) as an important part of the clinical management of individuals with diabetes (CDA, 2003). Successful diabetes management depends on the commitment of the person with diabetes to self-manage through lifestyle changes and for some medication as well. Diabetes education intervention includes knowledge and lifestyle behaviours such as healthy eating, exercise, and blood glucose monitoring. One of the main goals of diabetes education is to teach healthy lifestyle behaviours to optimize patients' blood glucose management in order to delay or prevent acute and chronic complications of diabetes.

There exists a large body of literature to support the effectiveness of diabetes education. In an examination of the effect of diabetes education on A1C (a measure of

glycemic control) by Norris, Engelgau, and Narayan (2001), diabetes education was found to improve A1C by 0.76% more than the control group. A 0.76 % drop in A1C coincides with an almost 2 mmol/L drop in average blood sugar (Rohlfing et al., 2002). A decrease in blood sugar reduces risk of complications of diabetes (CDA, 2003). Although improvements are shown in blood glucose control with diabetes education, aspects of the diabetes education intervention that contributed to its effectiveness are often not clear. According to an examination of eight studies in community-based settings by Jack, Liburd, Spencer, and Airhihenbuwa (2004), other factors influencing diabetes management knowledge and lifestyle behavioural outcomes are often not studied. There is a scarcity of research on factors such as family support, which can influence the success of diabetes management.

There are 7.8 million families in Canada (Statistics Canada, 1996). Statistics Canada defines family as a now-married couple (with or without never-married sons and/or daughters of either or both spouses), a couple living common-law (again with or without never-married sons and/or daughters of either or both partners), or a lone parent of any marital status with at least one never-married son or daughter living in the same dwelling. Family support may influence an individual's ability to implement diabetes management interventions. According to Louise Potvin (1995) from the Vanier Institute of the Family, children from families with emotional support have been found to have healthier diets. Couples characterized by shared decision-making powers, flexible division of tasks, and participation in common activities also have healthier lifestyles. The diabetes lifestyle encompasses a healthy lifestyle. Family beliefs, structures, and styles have a bearing on compliance with medical regimens. The support of family may

have an impact on how well a person with diabetes implements information gained from diabetes education to make positive lifestyle behavioural changes.

Statement of the Problem

Diabetes education allows for the transference of information to help the person with diabetes manage their condition. How well the person with diabetes implements the information he/she gains regarding healthy eating, exercise, and blood glucose monitoring from diabetes education, however, can depend on various factors. Diabetes can be psychologically and behaviourally taxing to the person living with this condition, and psychosocial factors such as depression, the ability for self-care diabetes management, and adjustment to the diagnosis may affect how well a person with diabetes manages (CDA, 2003). Inadequate family support may add to the challenge of diabetes self-care management and have an impact on blood glucose control (CDA, 2003).

Purpose of the Study

The purpose of this study was to examine the influence of family support on diabetes education behavioural outcomes, specifically diet, exercise, and blood glucose monitoring in individuals with Type 2 diabetes.

Jack et al. (2004), in a meta-analysis of eight studies, noted that factors including family and social support, which may influence the effectiveness of diabetes education knowledge implementation, are often not studied. The research undertaken within this study could contribute to the knowledge about the influence of family support towards diabetes education behavioural outcomes in individuals with Type 2 diabetes.

Rationale

Metabolic indicators such as A1C, body mass index, and lipid levels have been used to measure the effectiveness of diabetes education. The limitation of using metabolic indicators is that diabetes education may not be the only factor impacting the metabolic outcomes. Other factors such as medical treatment (e.g., diabetes medication, cholesterol medication, and weight loss medication) and family support of the person with diabetes may also have an impact on these metabolic outcomes. This study did not look at metabolic changes. Instead, this study looked at the influence that family support has on the behaviour changes in diet, exercise, and blood glucose monitoring made by individuals with diabetes after diabetes education.

Little research has been done to determine the influence of family support for the person with diabetes on diabetes education behavioural outcomes such as healthy eating practices, exercise, and blood glucose monitoring. Knowledge gained from learning more about other factors influencing diabetes behavioural outcomes will help in the development of diabetes education programs that will improve the likelihood of successful diabetes management and delay or prevention of diabetes complications. Further, sensitivity from health care providers, including encouraging family participation in diabetes education programs and adapting educational materials to include family involvement, may increase participation in self-management practices. Moreover, health and psychosocial assessment of both individuals with diabetes and their family may need to be considered if family influences diabetes management.

Theoretical Framework and Application in Diabetes Education

Diabetes education includes teaching individuals with diabetes to make lifestyle changes such as healthy eating, exercise, and blood glucose monitoring. The purpose of these behaviour changes is to gain management of blood glucose to avoid or delay long-term complications of diabetes. As this study involves diabetes education and pertains to adults with diabetes (adult education), this study used two theoretical frameworks, namely Bandura's (1971) self-efficacy model and Carl Rogers's (1969) humanistic approaches.

Bandura's self-efficacy model has been proposed as a framework for diabetes education (Peragallo-Dittko, 1995). The Self-Efficacy Theory posits that an individual's perception of his/her capabilities affects behaviour, level of motivation, thought patterns, and emotional reactions in stressful situations. That is, the more confident and capable an individual feels about making behavioural changes, the more likely it is that the person will actually make the behavioural changes. The process of learning is influenced by four sources of information: personal mastery, vicarious experiences, verbal persuasion, and physiologic feedback (Rankin & Stallings, 1996). This applies to diabetes education in that the enhancement of self-confidence and self-efficacy can lead to desired health behaviour changes and maintenance of desired behaviours. For example, an individual with diabetes can display personal mastery by being able to interpret blood sugar readings based on intake of food and amount of physical activity. Self-confidence could be developed by having the individual with diabetes demonstrate the process of blood glucose testing to others with diabetes. As well, self-confidence could also be developed if blood glucose levels are being kept within target ranges, through reinforcement from

diabetes educators that they are doing well with blood glucose control. Some studies suggest that patients with diabetes who have a high degree of self-efficacy exhibit better self-care, emotional well-being, and blood sugar control (Peragallo-Dittko, 1995). For instance, a study looking at exercise behaviour in patients with diabetes indicated that self-efficacy together with behavioural processes, self-concept, and social support discriminated between those that exercised and those that did not (Plotnikoff, Brez, & Hotz, 2000).

Carl Rogers (1969) refers to significant or experiential learning. Rogers states that experiential learning takes place when the subject matter is perceived by the learner as having relevance for his or her own purposes. This is relevant for patients attending a diabetes education class. One of the main reasons for being in the diabetes education class is to learn ways to control blood sugar levels and decrease or avoid long-term physical complications of the disease. In this respect, the education class could hold much personal meaning and significance to the individual. Type 2 diabetes develops in part due to hereditary factors. Some patients come to the classes with personal experiences to share, having seen family members deal with and afflicted with the complications of the disease. Rogers states that the role of the educator is to facilitate experiential or significant learning by creating a positive climate for learning and clarifying the purposes of the learner. This principle is also applicable in diabetes education. For instance, many cultural groups have their own beliefs and practices related to diet, health, illness, and lifestyle. It is therefore important to know how the practices and values held by patients affect their learning needs. In a study by Brown et al. (2000) examining the metabolic control, knowledge, and health of 252 Mexican Americans with

Type 2 diabetes, there were differing beliefs about ability to control diabetes even within this ethnic-specific group. In interacting with individuals with diabetes, the educator needs to be sensitive to individual and family cultural beliefs and practices that may create barriers to learning or adherence to a diabetes management regimen. For example, in some cultures, being overweight is considered desirable, and eating and sharing of foods high in fat and carbohydrates is often valued. Moreover, some European cultures and native Americans consider it impolite to refuse food that is offered when visiting another person's home (Peragallo-Dittko, 1995). Learning about the influence of family support can help to create a learning environment sensitive to these cultural factors.

According to Rogers (1969), learning that is threatening to the self (e.g., new attitudes or perspectives) is more easily assimilated when external threats are at a minimum. Rogers's humanistic approach to education, including trying to understand the person's perspective and the social and emotional aspects, appears appropriate as a second framework in understanding the effects of family support on diabetes management. Rogerian approaches, including empathetic teaching and learning, genuineness, unconditional positive regard, and setting a positive climate for learning, all reflect supportive qualities. All these aspects, whether coming from the diabetes educator or the family, may influence how well a person with diabetes manages his/her disease.

Importance of the Study

According to Health Canada (2003), 4.8% of Canadians aged 20 years and older had diabetes (4.6% of women and 5.0% of men) in 1998/99. Approximately 90% had Type 2 diabetes and 10% had Type 1 diabetes (Health Canada). An estimated 1,054,100 adults in Canada had diabetes diagnosed by a health professional and, of these, 40.6%

were between the ages of 20 and 59 years (Health Canada). There is no percentage estimate of diabetes given by Health Canada for the younger age groups at this time. The prevalence of diabetes increases with age. As the population ages, it is likely that there will be an increase of diabetes. According to Health Canada, this could have a major impact on the services needed to support the acute and chronic complications of diabetes. Services such as hospital care, home care, supportive housing, transportation, and drug benefits may be affected.

Research suggests that there is an influence of specific lifestyle and behavioural factors on the prevalence of Type 2 diabetes. Diet has long been believed to play a role in the development of diabetes, particularly since obesity is so closely associated with Type 2 diabetes. In a study by Pan et al. (1997) in Da Qing, China, a program of diet and exercise yielded a clinically significant absolute risk reduction of about 25% in the rate of Type 2 diabetes over 6 years. The development of obesity is one of the factors associated with the high prevalence of Type 2 diabetes. Based on cross-sectional studies of Type 2 diabetes prevalence in several populations, West (1978) showed that obesity was closely correlated with the prevalence of diabetes. Further studies by Colditz et al. (1990) and Knowler (1993) indicated that there is a positive association between obesity and the onset of Type 2 diabetes.

The prevalence of Type 2 diabetes may also be explained by differences in physical activity. For instance, a study in Fiji by Taylor and Zimmet (1984) showed that among adults performing moderate or heavy activity compared with those considered sedentary or undertaking only light activities, the prevalence of diabetes was twice as high in those with the lower degrees of physical activity.

In Canada, the economic burden of diabetes alone was estimated at $1.6 billion in 1998, $0.4 billion (25%) in direct costs and $1.2 billion (75%) in indirect costs (Health Canada, 2002). The Diabetes Control and Complications Trial (DCCT), (1996) and the United Kingdom Prospective Diabetes Study (UKPDS) (1998) showed that blood glucose control decreased the risk of long-term complications of diabetes. In the 1990s, diabetes care changed substantially with increased recognition of the importance of tight blood glucose control and diabetes self-management education. The potential for improving the health of individuals with diabetes and for decreasing the overall costs of the disease to the health care system and community lies in working towards better control of diabetes through implementing diabetes self-management practices. To achieve effective self-management of diabetes, an individual with diabetes must learn the body of knowledge, attitudes, and self-management skills related to the control of a chronic disease. Diabetes education is the teaching and learning of this body of knowledge and skills, with the ultimate goal being to promote the behavioural changes necessary for optimal health outcomes and quality of life (Peragallo-Dittko, 1995).

The knowledge gained from this study adds to the field of research regarding factors influencing the implementation of knowledge and skills gained from diabetes education and the effectiveness of diabetes education interventions. Considering the aging population and the estimated economic burden of diabetes in Canada, knowledge gained from this study can be used in the development of diabetes education programs and diabetes education approaches ultimately to improve blood glucose control in individuals with diabetes and prevent or delay complications of diabetes.

As diabetes management requires making lifestyle changes with respect to diet, exercise, and blood glucose monitoring, these changes can alter family role functioning and decision making (Fisher, 2000). Considering that family members' responses to chronic disease management affect a patient's self-care behaviour (Fisher), knowledge gained from this study will provide information about the effects of family support on diabetes management.

For the purpose of this study, the following are definitions of family, support, diet, exercise, and blood glucose monitoring used. Family is defined as a now-married couple (with or without never-married sons and/or daughters of either or both spouses), a couple living common-law (again with or without never-married sons and/or daughters of either or both partners), or a lone parent of any marital status with at least one never-married son or daughter living in the same dwelling (Statistics Canada, 1996). For this study, family will also include any individual the person with diabetes considers family. Support is defined as aid giving psychological understanding and the activity of providing for or maintaining by supplying with necessities. Family support is therefore defined as family members providing help by giving psychological understanding and actively providing for or maintaining by supplying with necessities. Diet refers to healthy eating practices as defined by the Canadian Diabetes Association. Exercise refers to physical activity not including activities of daily living. Finally, blood glucose monitoring refers to the testing of blood glucose using a device called a blood glucose meter and the recording, and analyzing of testing results.

Scope and Limitations of the Study

This study was conducted in one diabetes education centre in a metropolitan city in southern Ontario. It is a diabetes education centre that services only adults (age 18 and older) with Type 1 or Type 2 diabetes and is the only diabetes education centre in the city of study. This study involved only patients with Type 2 diabetes. Although several factors such as formal education, socioeconomic background, and age may influence whether a person with diabetes makes diabetes management behavioural changes, this study focused on examining the influence of family support on diabetes behavioural outcomes. The behavioural outcomes in this study were limited to diet, exercise, and blood glucose monitoring. Another limitation of this study is in the sample size. Although 94 questionnaires were distributed, only 53 were completed. The diabetes education centre in this study from 2002-2003 had 819 referrals and had 2,356 patient visits. Considering that the population of the city in which this study was conducted according to Statistics Canada (2001) was 150,836, estimating that about 5% of this population may have diabetes (7,542), the sample size used in this study may not be representative of the diabetes population within this city. Further, although participants indicated agreeing to be interviewed on the family support questionnaire, when approached by the researcher, most declined citing inconvenience.

The next chapter will review related literature, including literature on diabetes education, Albert Bandura and Carl Rogers, literature on family support and health and family support and diabetes.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

This chapter reviews some of the literature on the importance of diabetes education on health outcomes, theories in education and application to diabetes education, the effects of family on health in general, family support and cancer, and family support and diabetes management. Although studies have been done looking at the influence of family on diabetes management, metabolic laboratory indicators such as effects on lipid levels and A1C levels were often used in the following literature reviewed. It was noted through the review that studies looking at the influence of family support on behavioural indicators such as diet, exercise, and blood glucose monitoring necessary for diabetes management are rare.

Diabetes Education

The importance of diabetes education was recognized as early as 1927 when the Joslin Diabetes Centre sent nurses to the homes of patients to help them manage their diabetes. Diabetes education is effective in enhancing knowledge, skills, and behavioural change. It has been shown to improve self-care and clinical outcomes (CDA, 2003). As mentioned earlier in this paper, in an examination of the effect of diabetes education on A1C (a measure of glycemic control) by Norris et al. (2001), diabetes education was found to improve A1C by 0.76 % more than the control group. The Diabetes Control and Complications Trial (DCCT) increased the understanding of the role of diabetes educators (nurse educators and dietitians) in the management of diabetes (Meltzer et al., 1998).

Theories in Education and Application in Diabetes Education

Through diabetes education, individuals obtain information and knowledge on how to manage their diabetes. This knowledge creates the precondition for behavioural change. But additional self-influences are needed to overcome the challenges in incorporating new lifestyle behaviours and maintaining them. Albert Bandura focused on the acquisition of behaviours. Bandura's principles stem from social learning theory. Social learning theory explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural, and environmental influences. Environmental influences include social (e.g. family/ friends) and physical environment. This theory is applicable in this study as the influence of family support on behaviour outcomes is being examined.

Bandura (1971) believed that people acquire behaviours through the observation of others. The people then imitate what they have observed. Bandura's principles include that the highest level of observational learning is achieved by first organizing and rehearsing the modeled behaviour symbolically and then enacting it overtly. Next, coding modeled behaviour into words, labels, or images results in better retention than simply observing. Individuals are more likely to adopt a modeled behaviour if it results in outcomes they value. In diabetes, changing behaviour may lead to the desired outcome of delaying or avoiding long-term complications of the disease. Finally, according to Bandura, individuals are more likely to adopt a modeled behaviour if the model is someone respected by the observer and has admired status and the behaviour has functional value.

Beliefs of personal efficacy occupy a pivotal regulative role in the causal structure of social learning theory (Bandura, 1971). To Bandura, perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given levels of attainments. Although a sense of personal efficacy is concerned with perceived capabilities to produce effects, the events over which personal influence is exercised vary widely. It may involve regulating of one's own motivation, thought processes, affective states and behaviour patterns, or changing environmental conditions, depending on which aspects of life one seeks to manage. Efficacy belief is a major basis of action. Unless people believe they can produce desired effects by their actions, they have little incentive to make behaviour changes in the face of difficulties and challenges. Whatever else may serve as motivators, they must be founded on the belief that one has the power to produce desired changes by one's behaviour.

The ability to exercise control requires not only skills, but also a strong sense of efficacy to use them effectively and consistently under difficult circumstances. Efficacy beliefs not only operate in their own right. They act on other determinants in the regulation of behaviour (Bandura, 1971). A belief in one's learning efficacy and efficient deployment of effort enhance acquisition of knowledge and skills for managing the demands of everyday life. Efficacy beliefs also regulate motivation by determining the goals people set for themselves, the strength of commitment to them and the outcomes they expect for their efforts. The beliefs that people hold about their capabilities, therefore, affect whether they make good or poor use of the skills they possess. Self-doubts can easily overrule the best of skills. People's beliefs in their personal efficacy can be developed by four main sources of influence.

According to Bandura (1971), the most effective way of creating a strong sense of efficacy is through mastery experiences (personal mastery). Successes build a strong belief in one's personal efficacy. Failures undermine it, especially if failures occur before some sense of self-assurance has been established. If people experience only easy successes they come to expect quick results and are easily discouraged by failure. A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort. The second way of creating and strengthening self-beliefs of efficacy is through the vicarious experiences provided by social models. Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities to master comparable activities to succeed. Modeling influences do more than provide a social standard against which to judge one's own capabilities. Through their behaviour and expressed ways of thinking, competent models transmit knowledge and teach observers effective skills and strategies for managing environmental demands. Social persuasion is a third way of strengthening people's beliefs that they have what it takes to succeed. People who are persuaded verbally that they possess the capabilities to master given activities are likely to put forth greater effort and sustain it than if they have self-doubts and dwell on personal deficiencies when problems arise. The fourth way of modifying self-beliefs of efficacy is to reduce people's stress reactions. Understanding that whether or not an individual makes behavioural changes is influenced by a person's self-belief and his/her environment (social [including family] and physical) can help guide our understanding of the effects of family support on diabetes behavioural outcomes.

Carl Rogers's (1969) approach to education focuses on relationships. He described what he called significant or experiential learning. Rogers states that experiential learning takes place when the subject matter is perceived by the learner as having relevance for his or her own purposes. Similar to Bandura (1971), individuals are more likely to adopt a modeled behaviour if it results in outcomes they value or that mean something to the learner. This is very much applicable in individuals attending diabetes education classes. One of the main reasons for being in the diabetes education class is to learn ways to manage blood sugar levels in order to delay or avoid physical long-term complications such as blindness, heart attacks, stroke, and kidney disease. In this respect, the education class holds much personal meaning and value.

Rogers's approach looks at the particular issues, questions, and problems that participants find meaningful. As one particular type of diabetes called Type 2 diabetes develops in part due to a genetic predisposition, some individuals come to the classes with perceptions about diabetes and personal experiences to share, having seen and experienced family members deal with the physical effects of the disease. Another contribution of Rogers is that he states that the role of the educator is to facilitate experiential or significant learning by creating a positive climate for learning and clarifying the purposes of the learner. This is applicable in diabetes education. For instance, many cultural groups have their own beliefs and practices, a number of them related to diet, health, illness, and lifestyle. It is therefore important to know how the practices and values held by patients affect their learning needs. In a study by Brown et al. (2000) which looked at the metabolic control, knowledge, and health of Mexican Americans with Type 2 diabetes, there were differing beliefs about ability to control

diabetes even within this ethnic-specific group. In diabetes, the educator needs to be aware of and sensitive to any cultural beliefs and practices that may create barriers to learning or adherence to a diabetes regimen. For example, in some cultures, being overweight is considered desirable, and eating and sharing of rich foods is often valued. Moreover, some European cultures and native Americans consider it impolite to refuse food that is offered when visiting another person's home (Peragallo-Dittko, 1995). Creating a learning environment sensitive to these characteristics such as cultural factors can enhance learning. Economic factors can also affect a patient's learning. For example, in diabetes, a patient who cannot afford to obtain a new sterile syringe for each injection of insulin may find it difficult to learn to administer insulin when the health care professional teaches that a new syringe should be used each time. The treatment of diabetes is expensive, and many patients do not have insurance or qualify for assistance programs. Family support with respect to helping to pay for diabetes supplies (e.g., health insurance plans) can be helpful for some patients.

Carl Rogers (1969) espouses setting a positive climate for learning. When teachers have positive views of students' abilities, students are apt to behave or respond in positive ways (Purkey & Novak, 1996). This is very much applicable in health care education. A study looking at effective health care for overweight people showed that by creating a learning environment that welcomed individuals as they were, overweight women were able to obtain the benefits of a more physical and active lifestyle. A learning environment fostering a positive, supportive environment yielded positive health responses including improved blood pressure, improved blood sugar control, and decreased depression (Lyons & Miller, 2000).

Through diabetes education, individuals with diabetes are given the knowledge or tools to help them self-manage their disease. Carl Rogers (1969) saw the educator's responsibility as one of creating a warm atmosphere in which individuals/clients could explore, understand, and solve their own problems. Similarly, in diabetes education, individuals are given information about healthy eating, exercise, and blood glucose monitoring in an environment that is nonjudgmental so that individuals can problem solve and manage their own blood glucose levels. Providing diabetes education in an environment that decreases barriers to learning may help individuals to better learn about diabetes and to self-manage.

Putting diabetes knowledge gained through diabetes education into everyday practice is influenced by several factors. Factors influencing diabetes self-management include the individual's perspective, the health care team, and family and friends (Anderson & Rubin, 1996). According to Anderson and Rubin, family support is a critical component of successful diabetes management, and family members can help individuals with diabetes achieve optimum health and quality of life. Rogers (1969) refers to empathic understanding that describes the caring skill of temporarily laying aside our views, and values and of entering into another's world without prejudice. It is an active process of seeking to hear the other's thoughts, feelings, tones, and meanings as if they were our own. Having family support and understanding in diabetes management may help individuals with diabetes better manage their disease.

Family Support and Health

According to Louise Potvin (1995) from the Vanier Institute of the Family, researchers have found that health depends on an individual's economic, social, and

physical situation. Families influence the behaviour of their members, both adults and children. There is some level of evidence from the psychiatric literature that by actively soliciting family support, people might be more likely to adhere to medical advice (Zhang, Wang, Li, & Philips, 1994).

Seeman (2000) reviewed published studies on social relations with friends and family and health behaviours for the period 1970-1998. The review noted that social relationships that involved negative patterns of critical and demanding interactions had potential for negative health outcomes. These negative outcomes included a higher potential for depression and angina. Biological indicators such as increased stress hormones, increased cardiovascular activity, and depressed immune function were found where there were negative social interactions.

With respect to family support and cancer, Sadovsky (1997), in an article in the journal *American Family Physician*, noted that social support enhances cancer survival. Individuals connected with their community were found to do better than those who were isolated. It is posited by Sadovsky that this may be related to the greater likelihood that friends and family encourage individuals with cancer to exercise, eat healthily, and have regular medical visits. Also, he posits that this may be related to social relationships facilitating healthy lifestyle behaviours such as sleep, proper nutrition, exercise, and adherence to medical advice. Further, Sadovsky noted that individuals with cancer who attended group therapy had significantly longer survival periods than patients not attending group therapy. Sadovsky noted that another study of patients with malignant melanoma who attended education programs for cancer also had an increased survival period. Sadovsky, however, also noted that some studies indicate that factors such as

social ties, marital status, general satisfaction with life, and assessments of hopelessness and helplessness were not related to the survival time or cancer recurrence. With respect to cancer, it appears social support can influence health positively or have no influence on health.

Family Support and Diabetes Management

Although diabetes self-management is encouraged in persons with diabetes, diabetes creates a need for increased support (Guthrie & Guthrie, 2002). Support may take the form of informational, emotional, financial, and physical support. A study by Ott, Greeninig, Palardy, Holderby, and DaBell (as cited in Guthrie & Guthrie), found that there is a positive relationship between self-efficacy and adhering to diabetes management practices in adolescents with Type 1 diabetes. Codependency can also occur, that is, where the person with diabetes becomes dependent on others instead of taking responsibility for his/her own diabetes self-management (Guthrie & Guthrie).

Family characteristics such as family conflict are predictive of adherence difficulties (Peragallo-Dittko, 1995). Other characteristics such as family unity, organization, and family support are associated with better adherence and metabolic control according to Anderson and Auslander (as cited in Peragallo-Dittko, 1995). According to Peragallo-Dittko, an adaptive reaction to a diagnosis of diabetes in a family includes becoming educated about diabetes, offering support and encouragement, and being nonjudgmental. Peragallo-Dittko also noted that a limited support system might hinder adherence to diabetes management practices.

Similarly, according to Delamater et al. (as cited in Koenigsberg, Bartlett, & Cramer, 2004), family involvement in diabetes management, including appropriate task

sharing and assignment, decreasing family conflict, and improving family communication, improved diabetes self-management adherence and metabolic control. Also, a study by Gerstle, Varenne, and Contento (2001) showed that where home and family routines changed, women with diabetes had improved blood glucose control.

A study by Epple, Wright, Joish, and Bauer (2003) with 163 participants found that the presence of family support in Navajo individuals living with Type 2 diabetes was associated with control of A1C, triglyceride, and cholesterol levels. In this study, family support variables used included family members participating in cooking the meals for the individual with diabetes and purchasing or cooking "light" foods for or eating a "light" meal with the individual with diabetes. This study determined an improvement in diabetes control with family support; however, metabolic determinants of successful diabetes control such as improved A1C, triglyceride, and cholesterol levels were used. This study did not examine the behavioural changes made with respect to diet, exercise, and blood glucose monitoring. A study by Trento et al. (2001) also showed a positive association of family support with A1C and cholesterol levels in individuals with Type 2 diabetes. Furthermore, Gilliland, Azen, Ferez, and Carter (2002) found that individuals with Type 2 diabetes who had social support maintained steady A1C levels. Neither the Gilliland et al. nor the Trento et al. studies, however, looked at the effects of family support on behaviours such as exercise and blood glucose monitoring. In a study by Gilden, Hendryx, Casia, and Singh (1989), where family support was defined as family participating in diabetes education program, it was found that patients whose spouses participated showed greater improvement in knowledge, blood glucose control, and stress level. By contrast, Peyrot, McMurry, and Hedges (1986) found that spousal involvement

and knowledge might also lead to marital conflict that in turn hampers diabetes management. It appears that both positive and negative effects can occur with spousal involvement in diabetes management.

With respect to dietary control, a qualitative study by Trief et al. (2003) found that support from spouses with respect to grocery shopping, food preparation, a shared diet plan, or strict adherence to dietary guidelines was helpful in implementing dietary management.

Similarly, in the Trief et al. (2003) study, with respect to blood glucose monitoring, encouragement received from spouses, sticking to a routine in blood glucose monitoring, and the act of reminding were described as helpful supportive behaviours from spouses for individuals with diabetes implementing blood glucose monitoring practices. A study by Zgibor and Simmons (2002) also found that social and familial support increased participation in blood glucose monitoring practices in persons with diabetes.

Summary

In summary, a review of the literature indicated that with respect to family support and health and family support and cancer, benefits as well as negative influences to overall health outcome were seen. In like manner, with respect to family support and diabetes, both positive and negative influences to diabetes self-management adherence and metabolic control were seen. Through the literature reviewed, it was noted that most of the studies used metabolic indicators to measure successful diabetes management. Although a couple of studies looked at behavioural indicators such as diet adherence and blood glucose monitoring, the number of studies assessing the effects of family support

on adherence to diabetes self-management practices such as exercise, diet, and blood glucose monitoring were limited.

The next chapter will give a description of the research methodology used in this study including the survey design, details about the distribution of the survey, and the interview method.

CHAPTER THREE: METHODOLOGY AND PROCEDURES

This study examined the influence of family support on diabetes management behavioural outcomes (diet, exercise, and blood glucose monitoring). A quantitative research methodology using the survey method was used in this study. As well, a second mode of data collection, namely interviewing, was used with 4 of the participants in the study.

Approval for the Study

The manager of the diabetes education centre involved in this study as well as the individual responsible for ethics and research in the hospital for which the diabetes education centre is affiliated were approached and both gave their approval and support for conducting the study. Approval was also received from the Brock University Research Ethics Board (see Appendix C).

Description of Research Methodology

A mixed method research methodology using the survey method (self-administered questionnaires) and interviewing was used in this study. A mixed method was used in order to capitalize on the strengths of each method and also to diffuse the weakness of each method. The advantage of using a self-administered questionnaire in this study is it allows for a larger sample size. Further, accessibility to participants with this method is greater as the questionnaires were distributed to individuals attending the diabetes education program. The disadvantages of the self-administered questionnaire method include the possibility of unanswered questions. By contrast, the advantages of interviewing include the ability of the researcher to clarify or restate questions that the respondent does not at first understand (Singleton, Straits, Straits & McAllister, 1988).

Further, using the interview method allows the researcher to elicit a fuller, more complete response than will a questionnaire requiring participants to answer from a set of predetermined responses. This is particularly true in the case where participants are not able to read or write or when participants writing skills are weak and make them less motivated to make the effort to respond to the questionnaire (Singleton et al.).

Survey Design and Method

Typically, the effectiveness of diabetes education is measured using a pretest and a posttest to measure knowledge gained by patients attending the diabetes education program. Further, a measure of changes in laboratory results in A1C, cholesterol, and weight are often used to measure diabetes education effectiveness.

A questionnaire called the D-Smart (Diabetes Self-management assessment report tool) currently being used by the diabetes education centre of study was administered (see Appendix A). The D-Smart is a tool developed by the American Association of Diabetes Educators (AADE) and released in 2000. The D-Smart is a self-report instrument that captures current behaviour change and barriers to making appropriate behaviour changes (Mulcahy, Peeples, Tomky, & Weaver, 2000). The D-Smart captures behaviour change through patient self-report in physical activity (exercise), food choices (eating), medication administration, monitoring of blood glucose, problem solving for blood glucose, risk reduction activities, and psychosocial activities (Mulcahy et al.). In addition, the D-Smart includes demographic information including gender, occupation, race/ethnicity, and primary language. This study focused on the following sections of the D-Smart:

1. Demographic information (including gender, occupation, race/ethnicity, and primary language),
2. Exercise/Physical activity,
3. Eating, and
4. Blood glucose monitoring.

This tool was chosen for this study as it focuses on behaviour instead of knowledge, and because it looks at changes in behavioural outcomes instead of the more commonly measured changes in metabolic outcomes. This study focused on looking at behavioural changes made with respect to eating, exercise, and blood glucose monitoring and the influence of family support on behavioural changes made. Face and content validity have been incorporated in the D-Smart (Mulcahy et al.).

The process of gaining insight into the influence of family support on diabetes management behavioural outcomes, in individuals with Type 2 diabetes was initiated with the construction of a questionnaire on family support. The questionnaire was critiqued by diabetes educator staff members at the diabetes education centre of study. The staff that reviewed the questionnaire consisted of a Registered Nurse (Diabetes Nurse Educator) and two Registered Dietitians. The staff members also have Certified Diabetes Educator designations. Comments from the staff members pertaining to the relevance of questions asked, content, and order of questions were noted, and revisions were made based on the staff members' verbal input and written comments. The questionnaire consists of 12 questions about family support in the areas of eating, exercise, and blood glucose monitoring. An open-ended question about the ways in which the family can help the person with diabetes was included to elicit any possible information regarding family

support. A pilot of the family support questionnaire was filled out by three patients at the diabetes education centre who were not part of the study and feedback from the pilot was noted and slight changes were made to the questionnaire.

In summary, two questionnaires (see Appendix A) were used in this study:

1. D-Smart *(distributed at initial contact with diabetes education centre and approximately 6 weeks later during second contact with diabetes education centre)*, and
2. Questionnaire on Family Support.

The D-Smart questionnaire distribution followed current practice at the diabetes education centre of study. That is, it was distributed at initial contact with the diabetes education centre and approximately 6 weeks later at the scheduled second contact with the diabetes education centre. The questionnaire on family support, developed for this study was distributed only at the second contact with the diabetes education centre to allow time (approximately 6 weeks) for implementation of information received from the diabetes education at the initial contact.

The first mode of data collection in this study was through the use of the questionnaires (D-Smart and Family Support Questionnaire). The questionnaires consist predominantly of close-ended type questions. The benefit of the close-ended questions in the questionnaire is that given the numerous question items in the combined questionnaires, the close-ended questions were easier for the participants to answer since they required less effort and less facility with words. Moreover, the close-ended questions may have also made self-disclosure less difficult by presenting to the participants a range of presumably more "typical" responses.

Interview Method

The second mode of data collection used in this study was the interviewing of four participants representing both male and female participants. An equal number of male and female participants were interviewed. This study used a semistructured standardized script (see Appendix A) as well as used the Family Support Questionnaire questions in the interview. The researcher also developed questions spontaneously during the interview to capitalize on the knowledge, experience, or insights of participants related to the study topic.

One of the advantages of interviewing is that it allowed an opportunity to clarify questions and responses. Further, it allowed for probing and elaboration of participant responses to the Family Support Questionnaire. The interview method was also included in this study to compensate for the only open-ended question asked in the questionnaire (question #12) about ways family can help with diabetes management. The interview with each of the four participants occurred in the researcher's office at the diabetes education centre at a time designated convenient by the participants.

Selection of Participants

Adult patients attending the diabetes education centre with Type 2 diabetes, diagnosed within 3 months from initial contact with the diabetes education centre and/or attending diabetes education class for the first time, were included in this study. The D-Smart survey was distributed to all patients referred to the diabetes education centre attending the introductory (basic) education session on diabetes. This session constitutes the initial contact or visit at the diabetes education centre. The survey was was distributed in batches of approximately 20 per month from March to August 2005. As patients

arrived to attend the introductory education session, they were asked by the researcher both verbally and via consent form if they would be willing to participate in the study. They were informed that if they wished to participate, they would be required to read a brief explanation of the study and to fill out a consent form. As well, they were informed that if they agreed, they might be contacted to fill out an interview consent form to participate in a future audiotaped interview. Participants were randomly selected from the list of participants who had indicated on the Family Support Questionnaire that they agreed to be interviewed. Names of the participants representing males and females were randomly selected from this list. Participants were contacted via telephone to confirm that they would agree to be interviewed. Four participants who agreed to be interviewed after being contacted by the researcher and were able to arrange to come to the diabetes centre for the interview were the ones selected for the interview method.

Further, participants were informed that in approximately 6 weeks, during their scheduled second contact with the diabetes education centre, they would be asked to fill out the same D-Smart questionnaire as well as an additional questionnaire on family support.

In summary, the D-Smart surveys were distributed commencing March 2005 until approximately August 2005. The average number of surveys distributed was approximately 20 per month. The Family Support Questionnaire distribution commenced in April 2005 (approximately 6 weeks after the first D-Smart survey was distributed), and was continued until approximately August 2005.

Data Collection and Collation

The D-Smart surveys were collected from the period beginning March 2005 until August 2005. The D-Smart surveys were collected from participants during the initial contact with the diabetes education centre prior to the start of the education session and the second D-Smart collected prior to the start of the second education session held approximately 6 weeks later. The Family Support Questionnaire was collected from participants between the period beginning April 2005 until approximately August 2005. The Family Support Questionnaire was collected from participants at the second scheduled contact with the diabetes education centre before the start of the education session. Data pertaining to demographics (including gender, occupation, race/ethnicity, and primary language), exercise/physical activity, eating, and blood glucose monitoring were collected and collated. As well, responses to the Family Support Questionnaire were collected and collated. Only D-Smart questionnaires filled out by individuals with diabetes scheduled to attend the diabetes education centre were used in this study. The D-Smart questionnaire included a section indicating who completed the questionnaire. Each time the D-Smart questionnaire was completed, the name of the participant was tracked and the D-Smart questionnaires were placed in the patient's/participant's file. This is a routine practice at the Diabetes Centre where this study took place. Only Family Support questionnaires for which the D-Smart questionnaires were completed by the individuals with diabetes scheduled to attend the diabetes education centre were included in this study.

Interviews were conducted within approximately one week from completion of the second contact D-SMART questionnaire and the Family Support questionnaire.

Interviews were conducted by the researcher and took place in the researcher's office. Interview data were collected from four participants randomly chosen from those who agreed to be interviewed as indicated by them in the Family Support questionnaire. Interviews were audiotaped and transcribed verbatim by the researcher. Once interviews were transcribed, each participant received a summary/transcript of their interview via mail and informed to contact the researcher if there were any discrepancies in the transcription of the interview. None of the four participants interviewed expressed concerns with the transcribed document.

Data Processing and Analysis

The D-Smart questionnaire responses on diet, exercise, and blood glucose monitoring were compared pre (before diabetes education) and post (after diabetes education approximately one month later). The responses to the D-Smart questionnaires regarding diet, exercise, and blood glucose monitoring were analyzed in relation to the responses to the family support questionnaire.

Interview data collected from four participants were transcribed and analyzed as follows. Qualitative data in this study consisted of the responses from semistructured interviews with four participants with Type 2 diabetes. In the early stages of analysis, each transcript was reviewed several times. An inductive approach was used throughout the analysis to allow patterns to emerge out of the data (Patton, 1990). The researcher compared the emerging ideas within and between transcripts to assess patterns in the interview data. Participant comments, and the surrounding context of the comments (what led up to these comments) as well as responses for the family support questionnaire were also assessed.

Limitations

A limitation of the method used is the narrow range of items used in the questionnaires. The D-Smart questionnaire, although useful in looking at behavioural changes, was limited in the items pertaining to family and social support. In the Family Support Questionnaire, items included may not reflect all aspects that could describe support from family members. The questionnaire is limited to items of support in the areas of healthy eating, exercise, and blood glucose monitoring. The Family Support Questionnaire did not include items describing emotional support that may also influence diabetes self-management behavioural outcomes. As the Family Support Questionnaire was used in the interview method, the same limitations as mentioned could be said about the interview method used in this study. Participants were informed that the interview duration would be 15 to 30 minutes. Therefore, interview duration for all 4 participants interviewed was between 15 and 30 minutes. Perhaps if more time had been designated for the interview, more information from the participants could have been allowed to surface.

Ethical Considerations

As human participants were involved in this study, sensitivity to the rights and protection of the participants were maintained throughout the study. Participants were asked to sign a consent form to participate in the study. As well, participants were informed both verbally and in writing that they had the right to decline to answer any of the questionnaire and interview items. Further, data collected was reported as group data only, and the privacy and confidentiality of participants involved were respected.

Restatement of the Problem

According to the Canadian Diabetes Association (2003) family support, family dynamics, and circumstances that may make it challenging for individuals with diabetes to manage their condition can be predictors of successful diabetes management. This study examined whether the family support of a person with diabetes has any impact on diabetes self-care management behavioural outcomes (healthy eating, exercise, and blood glucose monitoring).

The next chapter will report the study findings including the results of the surveys distributed and the interviews conducted with 4 participants.

CHAPTER FOUR: FINDINGS

This chapter will provide an interpretation of the findings of the study starting with 1) the descriptive data of the participants involved in the study; 2) a summary of the family support questionnaire; 3) a comparison of the first contact D-SMART questionnaire with the second contact D-SMART questionnaire with respect to diet, exercise, and blood glucose monitoring; 4) the relationship between family support (questions from family support questionnaire) and the second contact D-SMART data pertaining to diet, exercise, and blood glucose monitoring and 5) the findings of the interviews conducted with four participants.

Descriptive Data of Participants

Out of 94 questionnaires distributed, 53 were completed (56%). Only participants who completed the first D-SMART questionnaire, the second D-SMART questionnaire, and the family support questionnaire were included in this study. There was a relatively equal representation of males and females, specifically 47% and 53% respectively. The average age of the participants in the study was 60 years. Almost half (47%) were retired, and the rest of the sample population were professionals, homemakers, skilled labourers, in clerical positions, or in sales. The sample population consisted of 94% Caucasian, with 96% of the sample population citing English as their first language. All of the participants in the study were receiving diabetes education through a diabetes education centre for the first time. Eighty-seven percent of the participants were diagnosed in 2005, and the rest were diagnosed between 1995 and 2003.

Family Support Questionnaire

This questionnaire was completed at the second contact with the diabetes education centre. Sixty-six percent of the respondents did not want their family to be more supportive. Seventeen percent wanted their family to be more supportive, and the other 17% answered "not applicable." For the question "Do you want your family to be less supportive? 79% answered "no," 19% answered "not applicable," and only 2% wanted their family to be less supportive. Seventy-seven percent of respondents found family support to be helpful. For the question, "In what way can your family help you?"18 participants responded. Responses included "Plan meals together that are more healthy," "take it more seriously," "exercise," and "they already help me."

Comparison of the First Contact D-SMART Questionnaire with the Second Contact D-SMART Questionnaire with Respect to Diet, Exercise, and Blood Glucose Monitoring

When comparing first contact responses to second contact responses regarding how participants decide what to eat, there was an 18% decrease in participants eating anything they wanted. There was a 7% increase in participants following a meal plan and a 4% increase in participants counting carbohydrates, avoiding sweets or sugar and limiting amount of fat consumed.

When comparing first contact responses to second contact responses regarding diet, 53% of participants had no change in their typical meal plan. Twenty-eight percent went from having breakfast, lunch, and dinner to breakfast, lunch, dinner, and snack. For the question "Where are your meals prepared?" 83% had no change from first contact to second contact with the diabetes centre. Eleven percent changed from eating out to eating

at home. From first contact to second contact with the diabetes centre, 40% had no change in skipping or missing a meal or scheduled snack. Forty percent had a decrease in skipping or missing a meal or scheduled snacks, and 20% had an increase in the number of skipped or missed meals or scheduled snack. Thirty-two percent of participants decreased how often they ate foods high in fat, 49% had no change in their fat consumption, and 19% actually increased the amount of fat intake. Forty-seven percent did not change how often they thought they ate more than they thought they should from first contact to second contact with the diabetes centre. Thirty-four percent of participants decreased in how often they thought they ate more than they thought they should from first contact to second contact with the diabetes centre. In 19% of the respondents, there was an increase in how often they thought they ate more than they thought they should from first contact to second contact with the diabetes centre.

Typical exercise between first contact and second contact with the diabetes centre did not change for 79% of participants in this study. Seventeen percent had an increase in their typical exercise, and 4% had a decrease in typical exercise. How often participants exercised remained the same between first contact and second contact for 49% of the participants. Forty-two percent increased the frequency in their exercise between first contact and second contact with the diabetes centre, and 9% had a decrease in the frequency of exercise. In terms of duration of exercise, 57% had no change between first and second contact with the diabetes centre. Thirty-two percent experienced an increase in their duration of exercise and 7% a decrease.

Seventeen percent of participants increased their blood glucose testing from first contact to second contact with the diabetes centre. Fifty-three percent had no change in

how often they checked blood sugar level, and 4% decreased how often they checked their blood sugar level. Thirty-two percent of participants had no change in the frequency of monitoring blood sugar later than they planned. Thirty-one percent had an increase in frequency of checking blood sugar late. Eleven percent decreased in the frequency of monitoring blood sugar later than the participant planned, and 26% answered "not applicable." The response of "not applicable" may be related to participant not yet starting blood glucose monitoring.

Diet and Family Support

Meal Preparation

Forty-one percent of participants answered that their family "always" helps with meal preparation. Twenty-three percent answered "sometimes," and 11% answered that their family "rarely" helped with meal preparation.

Grocery Shopping

With respect to grocery shopping, 43% of family "always" helped, 28% helped "sometimes," and 4% answered that their family "rarely" helped with grocery shopping.

Family Encouraging Healthy Food Choices

Fifty-six percent of participants answered that their family "always" encourages the participant to make healthy food choices, 17% answered "sometimes," and 2% answered "rarely."

Family Willing to Make Healthy Food Choices Along With Participant

Fifty-one percent of participants answered that their family is willing to make healthy food choices along with participant, and 23% answered "sometimes."

Family Attended Diabetes Class With Participant

Thirty-eight percent of participants had a family member attend the diabetes education sessions with them, and 62% attended diabetes education classes alone.

Family Attended Diabetes Class With Participant/Meal Preparation

Of the 38% that had a family member attend with participant, 80% answered that their family "always" helped with meal preparation. Twenty percent of those that attended diabetes with family and 24% of those that came alone answered "sometimes" to family helping with meal preparation.

Participant Attended Diabetes Class Alone/Meal Preparation

Of the 62% that came alone to the diabetes classes, only 18% answered that their family "always" helped with meal preparation.

Family Attended Diabetes Class With Participant Versus Participant Attending Diabetes Class Alone and Grocery Shopping

Of the 38% that had a family member attend with the participant, 75% "always" helped with grocery shopping versus 24% in the participants that came alone to the diabetes education sessions.

Family Attended Diabetes Class With Participant Versus Participant Attending Diabetes Class Alone and Family Encouraging Participant to Make Healthy Food Choices

Of the 38% that had a family member attend with the participant, 75% answered "always" to family encouraging participant to make healthy food choices versus 45% in the participants who came alone to the diabetes classes. There was minimal difference in

the response of "sometimes" in both the group that had family member attend diabetes classes (15%) and those that came alone (18%).

Family Attended Diabetes Class With Participant Versus Participant Attending Diabetes Class Alone and Family Willing to Make Healthy Food Choice Along With Participant

Seventy percent of those who had family member attend classes with participant felt their family was "always" willing to make healthy food choices along with participant versus 39% in those participants who came alone to the education sessions. There was not much difference in the response of "sometimes" in both the group that had family member attend diabetes classes (20%) and those that came alone to the classes (24%).

Family Attended Diabetes Class With Participant Versus Participant Attending Diabetes Class Alone and Applying Healthy Eating Principles

Of the 38% whose family attended diabetes class with participant, 95% applied at least one healthy eating principle compared to 69% in the 62% of participants who came alone to the diabetes class. Family attending class with participant seemed to increase healthy eating practices.

Whether family attended with participant or not did not seem to influence the healthy eating practice of having at least breakfast, lunch, and dinner (+/- snack). Ninety percent of the participants who came to class with family incorporated the healthy eating practice of having at least breakfast, lunch, and dinner (+/- snack) compared to 90% in the group who came alone to the diabetes class.

Whether family attended with a participant or not did not seem to influence where meals were prepared. For both groups, meals were prepared predominantly at home. Eighty percent answered meals prepared at home for the group who had family attend class with them compared to 79% meals prepared at home for the group who came alone to the diabetes class.

For the group who came alone to the diabetes class, 6% answered that they skipped meals or scheduled snack daily compared to none in the group who attended class with family.

For the group who came alone to the diabetes class, 3% answered that they ate foods high in fat, like fried foods, lots of butter, or mayonnaise, on a daily basis compared to none in the group who came with family to the diabetes class. Similar results were found for the group that came alone compared to the group who came to the diabetes class with family in the categories of eating foods high in fat "several times a week," "a few times a month," "once in a while," and "rarely or never." Except for the 3% of participants who thought they ate foods high in fat on a daily basis in the group who came alone to the diabetes class, no other difference was noted in the area of fat consumption when looking at the influence of family support.

In the group who attended the diabetes class with family, no one answered that they ate more often than they should on a daily basis compared to 12% in the group who came alone to the diabetes centre. Eighteen percent felt they were eating more often than they should on a several times a week basis in the group that came alone to the diabetes centre compared to 5% in the group who came with family. It appears that having family

attend diabetes class with participant decreased the frequency of eating more often than the participant thinks they should.

Fifty-seven percent of all participants answered "always" to family encouraging them to make healthy food choices. In this group, 27% decided what to eat by "avoiding sweets or sugar and limiting amount of fat" and 20% decided what to eat by only "avoiding sweets or sugar." Only 14% answered that they "followed a meal plan."

Seventeen percent of participants answered "sometimes" to family encouraging them to make healthy food choices. Of this group, 34% decided what to eat by "eating anything I want" and 22% by "avoiding sweets or sugar and limiting amount of fat."

Of the 2% that answered "rarely" to family encouraging them to make healthy food choices, 100% answered that how they decide what to eat is by "eating anything I want."

Of the 25% that answered "not applicable" to the question of family encouraging them to make healthy food choices, 22% answered that they decide what to eat by "avoiding sweets or sugar and limiting amount of fat."

Of the 57% of participants who answered "always" to family encouraging them to make healthy food choices, 90% had a typical meal plan consisting of "breakfast, lunch, dinner, and snack" (77%) and "breakfast, lunch, dinner" (13%). Of the participants who responded "sometimes" to family encouraging them to make healthy food choices or "not applicable," 100% had a typical meal plan consisting of "breakfast, lunch, dinner" and "breakfast, lunch, dinner, and snack." Family encouraging participant to make healthy food choices "always," "sometimes," or those who answered "not applicable" did not

seem to influence the typical meal plan of "breakfast, lunch, dinner" and "breakfast, lunch, dinner, snack" (see Table B1 in Appendix B).

Of the 57% of participants who answered "always" to family encouraging them to make healthy food choices, 80% had meals prepared "mostly at home." Similarly, of the 17% who answered "sometimes" to family encouraging them to make healthy food choices, 78% had meals prepared "mostly at home." Likewise, those who answered "not applicable" or "rarely" to family encouraging them to make healthy food choices, 77% and 100% respectively had meals prepared "mostly at home." Family encouraging participant to make healthy food choices "always," "sometimes," "rarely," or "not applicable" did not seem to influence where meals were prepared (see Table B2 in Appendix B).

Of the 57% of participants who answered "always" to family encouraging them to make healthy food choices, 63% skipped a meal or scheduled snack "rarely or never" or "once in a while." Fifty-six percent of those who answered "sometimes" to family encouraging them to make healthy food choices skipped a meal or scheduled snack "rarely or never" or "once in a while." For participants who answered "not applicable" to family encouraging them to make healthy food choices, 76% skipped a meal or scheduled snack "rarely or never" or "once in a while." Family encouraging participant to make healthy food choices "always" decreased the likelihood of skipped meals or scheduled snacks compared to family encouraging participant to make healthy food choices "sometimes" (see Table B3 in Appendix B).

Of the 57% of participants who answered "always" to family encouraging them to make healthy food choices, 66% ate foods high in fat "once in a while" or "rarely or

never" compared to 67% in the group who answered "sometimes" to family encouraging them to make healthy food choices. Whether family encouraged healthy food choices "always" or "sometimes" did not appear to influence the frequency of fat intake (see Table B4 in Appendix B).

Fifty-one percent of participant answered "always" to their family willing to make healthy food choices along with them. Of this 51%, 30% decided what to eat by "avoiding sweets or sugar" and "limiting fat intake" compared to 25% in the group whose family was willing to make healthy food choices along with them "sometimes." Whether family was willing to make healthy food choices along with participant "always" or "sometimes" did not appear to influence participants' decision on what to eat. However, in the group whose family was willing to make healthy food choices with participant "sometimes," 25% answered that they "ate anything they wanted" compared to none in the group whose family was "always" willing to make healthy food choices along with participant (see Table B5 in Appendix B).

When family is willing to make healthy food choices along with participant "always," the typical meal plan for 85% of participants was "breakfast, lunch, dinner and snacks" or "breakfast, lunch, dinner" compared to 100% when family was willing to make healthy food choices along with participant "sometimes." Seventy-nine percent of those who responded "not applicable" had a typical meal plan of "breakfast, lunch, dinner, and snacks" or "breakfast, lunch, dinner." The response of "not applicable" may be due to the participant living alone or perceiving family not to be involved in the willingness to make healthy food choices along with the participant. It appears that when family did not "always" make healthy food choices along with the participant, the typical

meal plan of "breakfast, lunch, dinner, and snacks" or "breakfast, lunch, dinner" increased (see Table B6 in Appendix B).

In the group who answered "always" to family willing to make healthy food choices along with participant, 59% missed or skipped a meal or scheduled snack "rarely or never" or "once in a while" compared to 75% in the group who answered "sometimes." It appears that when family was not "always" willing to make healthy food choices along with participant, there was a decrease in the practice of skipping meals.

In the group who answered "always" to family willing to make healthy food choices along with participant, 59% consumed foods high in fat "rarely or never" or "once in a while" compared to 66% in the group whose family answered "sometimes" to making healthy food choices along with participant. More participants ate less high-fat foods when family was willing to make healthy food choices along with participant "sometimes."

This seems to show that the less the family is willing to make healthy food choices along with participant, the better the participant does in terms of patterns of typical meal plan, skipped meals, and amount of high fat consumption.

Exercise and Family Support

Of the 38% of participants who had family attend the diabetes education class with them, 30% had a regular exercise program compared to 36% in the group who did not have a family member attend with them.

Of the 38% of participants who had a family attend the diabetes education class with them, 80% exercised a total of 20 minutes per day during a typical month at least

once in a while compared to 85% in the group who did not have a family member attend with them (see Table 1).

In terms of duration of exercise, similar results were found for both the group who had family member attend diabetes class (75% exercised >15 minutes) compared to those that came alone to the diabetes class (76% exercised >15 minutes). The group who came alone to the diabetes class however had a higher percentage of participants exercising >30 minutes. Specifically, 54% were exercising >30 minutes in the group who came alone to the diabetes class compared to 30% in the group who had a family member attend diabetes class with them (see Table 2).

Regular exercise program was the typical exercise for 60% of the participants who had answered to family "always" exercising with participant compared to only 30% and 37% for participants who had family exercise "sometimes" and "rarely" respectively (see Table B7 in Appendix B). It appears that when family exercises with participant, there is increased regular exercise.

Whether family exercised with participant "always" or "sometimes" did not seem to affect how often exercise was being done for at least 20 minutes per day during a typical month. Eighty percent of participants for both family exercising "always" and "sometimes" were exercising at least 20 minutes per day several times per week or daily (see Table B8 in Appendix B).

Table 1

Relationship Between Family Attending or Not Attending Diabetes Class With Participant and How Often Do You Exercise a Total of at Least 20 Minutes per Day During a Typical Month?

How often do you exercise a total of at least 20 minutes per day during a typical month?	Family attended with patient (Percent)	Family did not attend with patient (Percent)
Daily	20	30
Several X/week	40	45
A few X/month	10	3
Once in a while	10	6
Rarely or never	20	15

Table 2

Relationship Between Family Attending or Not Attending Diabetes Class With Participant and Duration of Exercise

Duration of exercise	Family attended with patient (Percent)	Family did not attend with patient (Percent)
1-15 minutes	20	24
16-30 minutes	45	22
31-45 minutes	5	24
46-60 minutes	10	15
More than an hour	15	15
n/a	5	0

For duration of exercise, participants whose family "always" exercised with them had the highest percent (80%) of participants exercising at least 31 minutes in duration. Only 40% of participants where family exercised with participant "sometimes" and 53% where family "rarely" exercised with participant were exercising at least 31 minutes in duration (see Table B9 in Appendix B).

For frequency of exercise, when family "always" encouraged exercise, 77% exercised at least several times per week compared to 58% and 50% in the groups whose family encouraged exercise "sometimes" and "rarely" respectively (see Table B10 in Appendix B). It appears the more often family encouraged exercise, the frequency of exercise increased.

For duration of exercise, when family "always" encouraged exercise, 95% exercised at least 15 minutes compared to 59% and 75% in the groups whose family encouraged exercise "sometimes" or "rarely" respectively. Between the family who "always" and "sometimes" encouraged exercise, the more the family encouraged, the greater the percentage of participants exercised >15 minutes.

Blood Glucose Monitoring and Family Support

With respect to blood glucose monitoring, of the 38% of participants who had family attend diabetes class with them, 90% of participants were monitoring blood glucose at second contact with diabetes centre compared to 82% in the group who came alone to the diabetes centre (see Table 3).

Table 3

Relationship Between Family Attending or Not Attending Diabetes Class With Participant and Frequency of Blood Glucose Monitoring

Family attended with participant	Percent blood glucose monitoring	Percent blood glucose monitoring once a day	Percent blood glucose monitoring 2X/day	Percent blood glucose monitoring 3X/day	Percent blood glucose monitoring 4 or >X/day	Percent not blood glucose monitoring
yes	90	10	30	30	20	10
no	82	15	24	12	6	18

Eleven percent of family "always" reminds participant to monitor blood glucose compared to 15% for the "sometimes" group and 34% in the "rarely" group. In all three groups, 90-100% were monitoring blood glucose at second contact with diabetes centre (see Table 4).

In terms of family helping to pay for blood glucose testing supplies, 70% answered "not applicable" to this question. The response of "not applicable" may be related to the population of study. The Ontario Health Insurance Plan covers the cost of blood glucose supplies in those 65 years of age and older. Further, some may have answered "not applicable" as extended health insurance plans also cover the cost of blood glucose testing supplies. Of the 21% whose family "always" helps pay for blood glucose testing supplies, 100% were testing several times per week or greater. In the group whose family "rarely" helped pay for blood glucose supplies, similar results were found, with 80% monitoring blood glucose several times per week or greater. With respect to blood glucose monitoring, family financial support did not appear to have an influence on whether a participant monitored blood glucose or the frequency of monitoring.

Table 4

Relationship Between How Often Family Reminds Participant to Monitor Blood Glucose and How Often Participant Monitors Blood Glucose

% responded "My family reminds me to monitor my blood glucose" from 53 participants	How often do you monitor your blood glucose levels	Percent
always (11)	several times per week or >	100
sometimes (15)	several times per week or >	100
rarely (34)	several times per week or >	90
n/a (40)	several times per week or >	83

Findings from Interviews

Four participants with pseudonyms of John, Paul, Jane, and Susan were interviewed. All four participants stated that healthy eating was encouraged by their families. One participant (Susan) stated that although she lived alone, her daughter would frequently call her on the telephone to encourage her to eat healthily. As well, she stated that during family gatherings, her family would keep an eye on her food choices and encourage her to eat healthily.

Meals were prepared with families for all but one of the four participants as that participant (Susan) lived alone. Meals were not always together with family for one participant (Paul) as he worked shift work.

Grocery shopping was done with family for all but one of the participants. Paul commented that he and his wife grocery shop together and have started to read labels on packages since attending the diabetes classes. One participant (Jane) commented that she found grocery shopping with her family was a hindrance to healthy eating. She indicated that her family would include grocery items that she did not necessarily agree with. Another participant (John) preferred grocery shopping by himself because he felt he was faster at this.

Three out of the four participants exercised with family. Paul stated that he and his wife would go for a walk or take the dog for a walk together, but that they did not go on a regular basis together as he worked shift work. Paul stated that his wife encouraged him to exercise though. Paul indicated that because of the type of work he did, patrolling a building, he was also quite active at work. One participant (Jane) wanted her family to be more involved with exercise. She stated she wished to exercise with someone. She

stated that although both she and her family had bicycles, her family member did not want to ride with her. She stated that she often does the encouraging when it comes to exercise. Another participant (Susan), although she lives alone responded that her family "always" encourages her to exercise. She stated that her daughter would call her and ask what she did that day, and she would often respond by saying she went for a walk. She stated her daughter encourages her to exercise and therefore she would walk a minimum of 45 minutes to an hour a day.

For all four participants interviewed, blood glucose monitoring did not involve the family. One participant (Susan) commented that blood glucose monitoring was her responsibility. Another participant (Paul) stated that because of his work schedule, blood glucose monitoring was done on his own. One participant (John) had not yet started blood glucose monitoring. For family helping to pay for blood glucose monitoring supplies, 2 responded "rarely" as one had not yet started blood glucose monitoring and the other stated she has a plan through work. The other 2 participants responded "not applicable" as each stated they had a medical plan that covered their blood glucose testing supplies.

With respect to family involvement in diabetes, one participant (John) found his wife's support to be helpful; however he felt his sister, who also had diabetes, should "keep her analysis of it to herself." John stated that he felt this way because their diabetes were related but she is on insulin and he is not. One participant (Jane) stated that when her family was willing to make healthy food choices along with her, both she and her family were pleased, and this was good. From the responses to the Family Support

Questionnaire and responses during the interviews, all 4 participants found family support overall to be helpful.

The next chapter will discuss the conclusions drawn from the findings of this study. Implications for practice, theory in education used in this study, and implications for future research will be addressed in the next chapter.

CHAPTER FIVE: SUMMARY, DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

This chapter will summarize the findings of this study including a discussion on how they compare with other studies mentioned in the literature review. Further, this chapter will discuss the implications of this study with respect to Bandura's and Rogers', theories, implications for practice in diabetes education and implications for future research in family support and diabetes education.

Summary

This study looked at the influence of family support on diabetes management behavioural outcomes (diet, exercise, and blood glucose monitoring). Individuals diagnosed with Type 2 diabetes within the past year along with individuals attending diabetes education sessions for the first time were included in this study. Individuals were asked to fill out the D-SMART questionnaire containing information about diet, exercise, and blood glucose monitoring at the initial contact with the diabetes centre and at the second contact with the diabetes centre approximately one month later. At the second contact, an additional questionnaire, namely the family support questionnaire, was also filled out by the participants in the study. Behavioural changes with respect to diet, exercise, and blood glucose monitoring were compared from initial contact to the second contact with the diabetes centre. Then, the family support questionnaire was used to see if there was any influence of family support on behavioural changes made with respect to diet, exercise, and blood glucose monitoring. Interviews were also conducted with four participants to gain further insight into their responses to the family support questionnaire.

This study found that of the 38% of participants who had family attend diabetes education classes with them, family were more involved in meal preparation, grocery shopping, and family encouraging the participant to make healthy food choices. In this same group, 95% decided what to eat by applying at least one healthy eating principle compared with only 69% in the group who came alone to the diabetes class. Further, in the group who attended the diabetes class with family, no one answered that they ate more often than they should on a daily basis compared to 12% in the group who came alone to the diabetes centre. It appears that having family attend diabetes class with a participant decreased the frequency of eating more often than the participant thinks he/she should. Family attending class with participant seemed to increase healthy eating practices.

This study, however, did not find family attending class with a participant influenced the typical meal pattern of participants. Ninety percent of the participants in both groups had a typical meal pattern of breakfast, lunch, and dinner (+/- snack). Where meals were prepared was also not influenced by family attending class or not with participant. For both groups, meals were prepared predominantly at home (80% vs. 79%).

Except for the 3% of participants who thought they ate foods high in fat on a daily basis in the group who came alone to the diabetes class, no other difference was noted in the area of fat consumption when looking at the influence of family support.

Does family encouraging a participant affect behavioural changes with respect to diet, exercise, and blood glucose monitoring? With respect to family encouraging participants to make healthy food choices, this study found that family encouraging participant to make healthy food choices did not seem to influence the typical meal plan

of "breakfast, lunch, dinner" and "breakfast, lunch, dinner, snack." Likewise, family encouraging a participant to make healthy food choices did not seem to influence where meals were prepared. Further, whether family encouraged healthy food choices did not appear to influence the frequency of fat intake. Whether family was willing to make healthy food choices along with participant also did not appear to influence a participant's decision on what to eat. However, in the group whose family was willing to make healthy food choices with the participant "sometimes," 25% answered that they "ate anything they wanted" compared to 0% in the group whose family was "always" willing to make healthy food choices along with participant.

With respect to exercise, this study found that family attending diabetes class with the participant did not influence a regular exercise program. In like manner, for duration of exercise, similar results were found for both the group who had family member attend diabetes class (75% exercised >15 minutes) compared to those that came alone to the diabetes class (76% exercised >15 minutes). The group who came alone to the diabetes class however had a higher percentage of participants exercising >30 minutes. Specifically, 55% were exercising >30 minutes in the group who came alone to the diabetes class compared to 30% in the group who had a family member attend diabetes class with them.

Does family exercising with participant affect exercise behaviour? This study found that when family exercises with participant, there is increased regular exercise. For duration of exercise, participants whose family "always" exercised with them had the highest percent (80%) of participants exercising at least 31 minutes in duration. However,

how often family exercised with a participant did not seem to affect how often exercise was being done for at least 20 minutes per day during a typical month.

Does family encouraging a participant to exercise have any influence on exercise behaviour? This study found that the more often family encouraged exercise, the frequency of exercise increased. For duration of exercise, the more the family encouraged, the greater the percentage of participants exercised >15 minutes.

Is blood glucose monitoring influenced by family support? With respect to blood glucose monitoring, of the 38% of participants who had family attend diabetes class with them, 90% of participants were monitoring blood glucose at second contact with diabetes centre compared to 82% in the group who came alone to the diabetes centre.

Whether or not the family reminds the participant to monitor blood glucose did not seem to influence blood glucose monitoring practices. In all three groups, 90-100% were monitoring blood glucose at second contact with the diabetes centre.

In terms of family helping to pay for blood glucose testing supplies, 70% answered "not applicable" to this question. With respect to blood glucose monitoring, family support did not appear to have an influence on whether a participant monitored blood glucose, or the frequency of monitoring. In the interviews, participants commented that blood glucose monitoring was something they were responsible for doing.

Discussion

According to Anderson and Auslander (as cited in Peragallo-Dittko, 1995), family support is associated with better adherence and metabolic control in diabetes. Similarly, a study by Ott, Greening, Palardy, Holderby, and DaBell (as cited in Guthrie & Guthrie, 2002) found that there is a positive relationship between family support, self-efficacy and

adhering to diabetes management practices in adolescents with Type 1 diabetes. Our findings seem to be consistent with these two studies. This study found that when family members attended class with a participant, providing in this case informational and perhaps emotional support, family were more involved in meal preparation, grocery shopping, and family encouraging the participant to make healthy food choices. In the group who had family attend diabetes class with participant, 95% decided what to eat by applying at least one healthy eating principle compared with only 69% in the group who came alone to the diabetes class. Family attending class with participant seemed to increase healthy eating practices. This is consistent with the findings of the study by Gilden et al. (1989), where it was found that patients whose spouses participated showed greater improvement in knowledge, blood glucose control, and stress level.

This study, however, did not find that family attending class with participant influenced the typical meal pattern of participants. Ninety percent of the participants in both groups had a typical meal pattern of breakfast, lunch, and dinner (+/- snack). Where meals were prepared was also not influenced by family attending class, or not with participant.

Except for the 3% of participants who thought they ate foods high in fat on a daily basis in the group who came alone to the diabetes class, no other difference was noted in the area of fat consumption when looking at the influence of family support.

Peyrot et al. (1986) found that spousal involvement and knowledge might also lead to marital conflict that, in turn, hampers diabetes management. Although this study did not look at marital conflict, consistent with the findings from Peyrot et al., it appears that when family did not "always" make healthy food choices along with participant, the

typical meal plan of "breakfast, lunch, dinner, and snacks" or "breakfast, lunch, dinner" increased. Also, it appears that when family was not "always" willing to make healthy food choices along with participant, there was a decrease in the practice of skipping meals and decrease in fat consumption. In this study, when families were less involved with making healthy food choices along with participants, there was an increase in healthy eating practices. Consistent with this, one participant in an interview commented that grocery shopping with family was detrimental instead of helpful.

With respect to dietary control, a qualitative study by Trief et al. (2003) found that support from spouses with respect to grocery shopping, food preparation, a shared diet plan, or strict adherence to dietary guidelines was helpful in implementing dietary management. Consistent with the Trief et al. study, this study found that family encouraging participant to make healthy food choices "always" decreased the likelihood of skipped meals or scheduled snacks compared to family encouraging participant to make healthy food choices "sometimes."

With respect to blood glucose monitoring, family support did not appear to have an influence on whether a participant monitored blood glucose or the frequency of monitoring. In the interviews, one participant commented that blood glucose monitoring was the responsibility of the participant. This finding is contrary to the study by Trief et al. (2003), where encouragement received from spouses, sticking to a routine in blood glucose monitoring, and the act of reminding were described as helpful, supportive behaviours from spouses for individuals with diabetes implementing blood glucose monitoring practices. A study by Zgibor and Simmons (2002) also found that social and familial support increased participation in blood glucose monitoring practices in persons

with diabetes. This study conflicts with prior studies with respect to blood glucose monitoring. This may be due to the average age of the participants in this study. The average age is 60, and some participants commented that they had insurance plans for their blood glucose monitoring supplies and that blood glucose monitoring was something they did on their own. Further, unlike diet and exercise practices that could be applied to family members as well, blood glucose monitoring may have been perceived by participants as applying to them alone.

Implications for Practice

The knowledge gained from this study may influence how diabetes education is delivered. Diabetes management requires individuals making lifestyle changes with respect to diet, exercise, and blood glucose monitoring. These changes can alter family role functioning and decision making (Fisher, 2000). From this study, it appears that having family attend diabetes class with individuals with diabetes had a positive influence on healthy eating behaviours and that family encouraging individuals with diabetes positively influenced exercise. Diabetes education programs can encourage family to attend classes or get involved in encouraging the person with diabetes to apply healthy eating practices and to exercise so that it may help to increase healthy eating behaviours and frequency of exercise. Considering that family members' responses to chronic disease management affect a patient's self-care behaviour (Fisher), knowledge gained from this study confirms the effect that family support has on diabetes management. Diabetes education centres can also include an assessment of family support for individuals with diabetes as part of their program. Doing an assessment of family support may give data into possible barriers or aid in allowing an individual with

diabetes to manage their disease. As the prevalence of diabetes is growing and the risk for Type 2 diabetes increases with family history (CDA, 2003), it seems appropriate to include family in the diabetes education process.

Development of Type 2 diabetes may be prevented or delayed in people with pre-diabetes with diet and physical exercise (Eriksson & Lindgarde, 1991; Tuomilento et al., 2001). Health promotion activities that educate families early on about healthy eating and exercise may help in delaying or preventing the development of Type 2 diabetes. The increasing prevalence of obesity in the Western world will also result in an increase in the burden of diabetes (CDA, 2003). Educating families early on about healthy eating and exercise may help prevent obesity and subsequent diabetes. Diabetes is costly to both the individual with diabetes and to the health care system. Educating individuals with diabetes and their families about healthy eating and exercise may help prevent long term complications of diabetes and subsequent economic burden of diabetes.

Implications for Theory

The extent to which the two theoretical models (Bandura and Rogers) were used in this study was superficial. Family attending diabetes classes with participants had a positive influence with respect to diet. Bandura's (1971) self-efficacy theory posits that an individual's perception of his/her capabilities affects behaviour, level of motivation, thought patterns, and emotional reactions in stressful situations. That is, the more confident and capable an individual feels about making behavioural changes, the more likely it is that the person will actually make the behavioural changes. Through diabetes education, individuals with diabetes along with their family become equipped with knowledge towards healthy eating and exercise. Family members engaging in healthy

eating practices can help individuals with diabetes to do the same. In an interview with one participant, he stated "We're trying to watch what we eat and we've both been loosing weight."

Consistent with Rogers (1969), learning new attitudes or perspectives is more easily assimilated when external threats are at a minimum. In this study, a family encouraging a participant to exercise was beneficial in implementing the diabetes management practice of exercise. As well, family exercising with participant increased regular exercise. In an interview with one participant, she stated with respect to exercise, "I would love it if they would. You know, X and I both have bikes. I like to do stuff with somebody exercise wise." Rogerian approaches including empathetic teaching and learning, genuineness, unconditional positive regard, and setting a positive climate for learning all reflect supportive qualities. These aspects of support coming from the family positively influenced how well a person with diabetes managed their disease.

Implications for Further Research

This study examined the influence of family support on diabetes education behavioural outcomes within an approximately 1-month period. Future research can look at the long-term effects of family support on diabetes education behavioural outcomes. As time is necessary to implement change in behaviour, perhaps a study looking at the influence of family support over a 6-month, 1-year, or greater period should be examined. This study examined the individual with diabetes and their perception of family support in an approximately 1-month period. Future studies can investigate if the perception of family support, by individuals with diabetes, changes over time by following the participants for 1 year or greater. Similarly, future studies can include exploring family

perception of support, and how this may influence diabetes management, or if family perception of support changes with time. If family support diminishes with time, then this may have implications for the need for follow-up appointments at diabetes education centres, and require looking for resources to help individuals with diabetes continue to make behavioural changes to manage their disease. Bandura's (1971) self-efficacy theory posits that an individual's perception of his/her capabilities affects behaviour. Future research may investigate if there is a relationship between and individual's perception of diabetes management and diabetes management behaviours. Further, future research can investigate assessing family members and their points of view upon diagnosis of diabetes in the family, and how this affects family support. This study found that family attending diabetes class with participants had a positive influence with respect to diet, but had no influence with respect to exercise and blood glucose monitoring. Future research in family support and diabetes management can expand on questions related to exercise and blood glucose monitoring to investigate factors that influence these two behaviours. Healthy eating practices and exercise can delay progression to diabetes (Eriksson & Lindgarde, 1991). Future research may even look at behavioural changes that occur in family members themselves in having someone in the family diagnosed with diabetes. This may have implications for the prevention of diabetes and minimizing the adverse consequences of diabetes long-term complications. With regard to the psychosocial correlates, it was observed by DeCoster (2005) that adults with type 2 diabetes use a variety of coping methods, with their basic coping styles influenced by race and gender. Future research may look at gender differences and family support. Finally, future

research may even look at support for family members of individuals with diabetes and how this may influence diabetes management.

Conclusions

Approximately one month after diabetes education, there was a decrease in participants eating anything they wanted. There was an increase in participants following a meal plan and an increase in participants counting carbohydrates, avoiding sweets or sugar, and limiting amount of fat consumed. Participants decreased how often they ate foods high in fat and how often they thought they ate more than they thought they should. Diabetes education also had positive influences with respect to exercise. Specifically, there was an increase in their typical exercise and an increase in duration of exercise after attending diabetes class. With respect to blood glucose monitoring, participants increased their blood glucose testing approximately one month after attending diabetes class. This study showed that diabetes education influenced behavioural changes in diet, exercise, and blood glucose monitoring, unlike prior studies that used metabolic indicators to see effects of diabetes education.

The influence of family support on behavioural changes with respect to diet, exercise, and blood glucose monitoring were mixed. Family attending diabetes class with participants had a positive influence with respect to diet, but had no influence with respect to exercise and blood glucose monitoring.

Family encouraging participant with respect to diet overall did not influence healthy eating behaviours except for decreased skipped meals and scheduled snacks. In fact, in the areas of family willing to make healthy choices along with participant, the less the family was involved in encouraging, the better the participant did.

Exercise on the other hand was influenced positively by family encouragement. Family encouragement however did not appear to influence blood glucose monitoring behaviours.

Overall, in the interviews with four participants, all four participants stated that they felt family support was helpful. Especially in the areas of healthy eating and exercise, family encouragement was found to be helpful in making diabetes management behavioural changes.

This study demonstrated that family support does influence diabetes management behavioural outcomes, specifically in the areas of healthy eating and exercise. More research is necessary to increase our knowledge in other nonmetabolic factors that can influence how well a person with diabetes manages his/her disease.

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Appendix A

Questionnaires

Family Support Questionnaire

Name: _____ Date: _____

A member of my family attended today's appointment with me. □Yes □No
Please circle most applicable response.

Eating:

1. My family helps with meal preparation.

   Rarely Sometimes Always Not Applicable

2. My family helps with grocery shopping.

   Rarely Sometimes Always Not Applicable

3. My family encourages me to make healthy food choices.

   Rarely Sometimes Always Not Applicable

4. My family is willing to make healthy food choices along with me.

   Rarely Sometimes Always Not Applicable

Exercise:

5. My family exercises with me.

   Rarely Sometimes Always Not Applicable

6. My family encourages me to exercise.

   Rarely Sometimes Always Not Applicable

Blood Glucose Monitoring:

7. My family reminds me to monitor my blood glucose levels.

   Rarely Sometimes Always Not Applicable

8. My family helps me pay for my blood glucose testing supplies.

   Rarely Sometimes Always Not Applicable

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9. Do you want your family to be more supportive? □Yes □No

10. Do you want your family to be less supportive? □Yes □No

11. Do you think your family support is helpful? □Yes □No

12. In what way could your family help you? _____

13. I am willing to be interviewed at a later date to discuss this questionnaire if asked. □Yes □No

Thank you.

Diabetes Self-Management Assessment Report Tool (D-SMART)©

Name: _____ Date: _____

Gender:	O Female O Male	**Age:** _____	**Year when you were told you had diabetes:** _____
Occupation:	O Professional/ Managerial O Sales O Clerical O Skilled Labour O Other Labour	O Student O Homemaker O Retired O Unemployed O Other	**In the past 3 months, how many times have you had:**
Race/ Ethnicity: (mark all that apply)	O White or Caucasion O Native O Asian (e.g. Chinese, Japanese, Korean)	O Black or African American O Hispanic	**Infections:** O Head, throat, chest O Wound O Bladder O Vaginal (yeast) O None
Do you have any:	O Hearing problems O Visual problems	(mark all that apply)	**Emergency room visits for low blood sugar:** _____
Primary Language:	O English O Other: Please list: _____		**Hospital Admissions:** _____ **Days missed from work, School or usual routine:** _____ (# of days)

Questions 1-32 focus on "What you have been doing the past 3 months". There are no right or wrong answers. For each question pick the answer which is closest to how things have gone recently, and mark only that one answer (unless you are told to mark all that apply).

1. What is your typical exercise?

O Regular exercise program
O Activities of daily living only
O Limited due to physical problems

2. How often do you exercise a total of at least 20 minutes per day during a typical month?
Exercise includes all physical activity (i.e. walking, an active job, yardwork, etc.) as well as sports, jogging etc.

O Daily
O Several times a week
O A few times a month
O Once in a while
O Rarely or never

3. When you exercise, how long do you usually do it?

O 1-15 minutes
O 16-30 minutes
O 31-45 minutes
O 46-60 minutes
O More than an hour

Diabetes Self-Management Assessment Report Tool (D-SMART)®

Eating

4. How do you usually decide what to eat?

- ○ Count calories
- ○ Count carbohydrates
- ○ Follow a meal plan
- ○ Avoid sweets or sugar
- ○ Limit amount of fat
- ○ Eat anything I want
- ○ Other

5. What is your typical meal pattern?

- ○ Breakfast, lunch, dinner
- ○ Breakfast, lunch, dinner & snacks
- ○ Eat whenever I'm hungry
- ○ Changes due to my work schedule
- ○ Other

6. Where are your meals prepared?

- ○ Mostly at home
- ○ A lot at home, but also regularly eat out or take out
- ○ Mostly eat out or take out

7. How often do you miss or skip a meal or scheduled snack?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

8. How often do you eat foods high in fat, like fried foods, lots of butter or mayonnaise?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

9. How often do you eat more than you think you should?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

Medications

10. Do you take diabetes medication?

- ○ I take insulin and/or oral medication (tablets) for my diabetes
- ○ I don't take diabetes medication (GO TO QUESTION #13)

11. How often do you miss or skip a dose of any of your diabetes medication?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

12. How often do you take your diabetes medication later than planned?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

Blood Sugar Monitoring

13. How often do you usually check your blood sugar?

- ○ 4 or more times/day
- ○ 3 times/day
- ○ 2 times/day
- ○ Once a day
- ○ Several times a week
- ○ Once a week or less
- ○ Rarely or never (GO TO QUESTION #17)

14. How often do you miss or skip a planned blood sugar check?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

15. How often do you check your blood sugar late?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

Problem Solving: High Blood Sugar

16. When you check your blood sugar, what blood sugar level do you consider too high?

- ○ I don't know
- ○ Over 5.5
- ○ Over 7.0
- ○ Over 8.5
- ○ Over 10.0
- ○ Over 11.5
- ○ Over 13.0

17. How often do you have high blood sugars?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely
- ○ Don't know
- ○ Never (GO TO QUESTION #21)

18. When your blood sugar is too high, how often do you do the following?

(mark one answer for each question)	Every Time	Most Times	Some Times	Rarely/ Never
Change diet	○	○	○	○
Increase diabetes medication	○	○	○	○
Do nothing	○	○	○	○

19. When your blood sugar runs higher than usual over several days, how often do you do the following?

(mark one answer for each question)	Every Time	Most Times	Some Times	Rarely/ Never
Call my health care provider	○	○	○	○

20. When your blood sugar is high, how often are you able to get it back down to where you want it?

- ○ Every time
- ○ Most times
- ○ Some of the time
- ○ Rarely or never

Problem Solving: Low Blood Sugar

21. When you check your blood sugar, what blood sugar level do you consider too low?

- ○ I don't know
- ○ Under 5.5
- ○ Under 5.0
- ○ Under 4.5
- ○ Under 4.0
- ○ Under 3.5
- ○ Under 3.0

22. How often do you have low blood sugars?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely
- ○ Don't know
- ○ Never (GO TO QUESTION #25)

23. When your blood sugar is too low, how often do you do the following?

(mark one answer for each question)	Every Time	Most Times	Some Times	Rarely/ Never
Eat more	○	○	○	○
Reduce diabetes medication	○	○	○	○
Check meter/strips	○	○	○	○

24. When your blood sugar is low, how often are you able to get it up to where you want it within ½ hour?

- ○ Every time
- ○ Most times
- ○ Some of the time
- ○ Rarely or never

25. Do you wear a bracelet or keep something with you to identify that you have diabetes?

○ Yes ○ No

Problem Solving Sick Days:

26. When you are sick or cannot eat your usual food, how often do you do the following?

	Every Time	Most Times	Some Times	Rarely/Never
Replace usual food with carbohydrates	O	O	O	O
Drink more water	O	O	O	O
Take diabetes medication	O	O	O	O
Check ketone level	O	O	O	O
Check blood sugar more often	O	O	O	O
Do nothing different	O	O	O	O
Contact Health Care Provider	O	O	O	O

Risk Factor Modification

27. Which of the following risk factors for possible diabetes complications do you have?

(mark all that apply)

- O High blood sugar
- O High cholesterol
- O Smoking
- O Overweight
- O High blood pressure

28. When was the last time you had the following health services to prevent problems?

(mark one answer for each question)	Within last 6 months	6-12 months ago	1-2 yrs ago	More than 2 yrs	Never	Don't know
Saw a diabetes educator	O	O	O	O	O	O
Saw a medical doctor	O	O	O	O	O	O
Saw a dentist	O	O	O	O	O	O
Saw a dietitian	O	O	O	O	O	O
Had eyes checked by an eye doctor	O	O	O	O	O	O
Had feet checked by a health care provider	O	O	O	O	O	O
Had cholesterol checked	O	O	O	O	O	O
Had blood pressure checked	O	O	O	O	O	O
Had a Hemoglobin A1c test (HbA1c)	O	O	O	O	O	O
Had urine checked for protein	O	O	O	O	O	O
Had flu vaccine	O	O	O	O	O	O
Had pneumonia vaccine	O	O	O	O	O	O
Had counselling about what to do before getting pregnant	O	O	O	O	O	O

29. How often do you closely examine your feet with your socks off?

- ○ Daily
- ○ Several times a week
- ○ A few times a month
- ○ Once in awhile
- ○ Rarely or never

30 a. Please tell us how you feel about your diabetes.

	A lot	Some	A little	Not at all
How sure are you that you can manage your diabetes?	○	○	○	○
[redacted]				
How much does your medical team help with your diabetes?	○	○	○	○

30 b. Please tell us how your diabetes affects your life.

	A lot	Some	A little	Not at all
How much does diabetes interfere with your job, school, or daily activities?	○	○	○	○
[redacted]				
How much does your diabetes seem out of control?	○	○	○	○
[redacted]				
How often do you feel depressed?	○	○	○	○
[redacted]				

31. The next 2 questions focus on "What would you like to do or change?" Having diabetes means you may need to make changes. What changes, if any, would you like to make now? Don't try to make too many changes.
In Column A: Fill in the oval next to the 1, 2, or 3 things that you want to change most.
In Column B: For each item chosen in Column A, mark the oval in Column B that best describes how sure you are that you can make the change you want. (Do not fill out column B for items that you did not select in Column A)

A Changes you want to make (mark only 1,2, or 3 things in this column)	B Confidence for making change			
	Sure I can	Think I can	Not sure I can	Don't think I can
PHSYICAL ACTIVITY				
a. ○ Exercise more often	○	○	○	○
b. ○ Exercise longer	○	○	○	○
EATING				
c. ○ Follow a special diet	○	○	○	○
d. ○ Eat better food	○	○	○	○
e. ○ Eat less fat	○	○	○	○
MEDICATION				
f. ○ Miss fewer medications	○	○	○	○
g. ○ Take medications on time more often	○	○	○	○
BLOOD SUGAR MONITORING				
h. ○ Check my blood sugar more often	○	○	○	○
i. ○ Miss fewer blood checks	○	○	○	○
j. ○ Do my blood check at a little more often	○	○	○	○
PROBLEM SOLVING				
k. ○ Prevent high blood sugars	○	○	○	○
l. ○ Treat high blood sugars	○	○	○	○
m. ○ Prevent low blood sugars	○	○	○	○
n. ○ Treat low blood sugars	○	○	○	○
o. ○ Manage diabetes when sick	○	○	○	○
RISK REDUCTION				
p. ○ Get preventive health services	○	○	○	○
q. ○ Check my feet	○	○	○	○
r. ○ Stop smoking	○	○	○	○
s. ○ Lose weight	○	○	○	○
t. ○ Get blood pressure under control	○	○	○	○
u. ○ Learn how to have a safe pregnancy	○	○	○	○
LIVING WITH DIABETES				
v. ○ Cope with diabetes	○	○	○	○
w. ○ Get support from my medical team	○	○	○	○
x. ○ Get support from my family/friends	○	○	○	○

32. How much do the following things keep you from making the changes you want?

(mark one answer for each question)	A lot	Some	A little	Not at all
I don't know what to do or how to do it	O	O	O	O
I don't have the time	O	O	O	O
I can't see well enough to do it	O	O	O	O
No place to do it	O	O	O	O
My family/friends do not support me	O	O	O	O
It's too uncomfortable	O	O	O	O
I don't enjoy it	O	O	O	O

This form was completed by: O Self O Other (preferred not a health care provider)

Thank you for taking the time to answer these questions about your diabetes.

For office use only

Date (mm/dd/yyyy)	**Patient ID**	
Reviewed by Educator		
Education Service	O Comprehensive education program	O Follow up education (topic-specific)
Intervention Format	O 1:1 O Combination of 1:1 and Group O Group	
Type of Diabetes (mark one)	O Type 2 - diet only O Type 2 - pills only O Type 2 - pills and insulin O Type 2 - insulin only O Other (secondary to surgery, drugs etc)	O Type 1 - 1 injection per day O Type 1 - 2 injections per day O Type 1 - 3 injections per day O Type 1 - 4 or more injections per day O Type 1 - insulin pump

Interview Method Semistructured Script

Semistructured Script:

Researcher: Today's date is ..... This interview is for a study examining the influence that family support has on diabetes management, specifically with respect to healthy eating, exercise, and blood glucose monitoring. Thank you ..... for agreeing to participate in this interview. You have filled out the "Family Support Questionnaire." We will go through the questionnaire and wherever you can elaborate, please do so. Please feel free to explain or expand on your response on the family support questionnaire at any time.

*Researcher Prompts for helping participant expand on response to "Family Support Questionnaire":

- You responded.....X.....to this question *(on "Family Support Questionnaire")* because…
- Can you think of anything else that you could add with respect to this questionnaire information-wise?
- Can you think of any ways at all your family could be more supportive?
- It sounds like..... can you elaborate?
- For question # X, you circled XX..... can you expand?

Conclusion:

Researcher: Thank you again for participating in this interview. A transcript of the interview will be mailed to you within the next 2 weeks. Please do not hesitate to contact me if you have any questions about the transcripts or any questions about the study.

Appendix B

Data Tables

Table B1

Relationship between family encouraging healthy food choices with typical meal plan

My family encourages me to make healthy food choices.	What is your typical meal plan?	Percent
always	changes due to my work schedule	3%
always	breakfast, lunch, dinner, and snacks	77%
always	breakfast, lunch, and dinner	13%
always	breakfast, lunch, dinner, and snacks; changes due to my work schedule	7%
sometimes	breakfast, lunch, dinner, and snacks	44%
sometimes	breakfast, lunch, and dinner	56%
rarely	eat whenever I'm hungry	100%
n/a	breakfast ,lunch, dinner, and snacks	54%
n/a	breakfast, lunch, and dinner	46%

Table B2

Relationship between family encouraging healthy food choices with where meals are prepared

My family encourages me to make healthy food choices.	Where are your meals prepared?	Percent
always	mostly at home	80%
always	a lot at home, but also regularly eat out or take out	20%
sometimes	a lot at home, but also regularly eat out or take out	22%
sometimes	mostly at home	78%
rarely	mostly at home	100%
n/a	mostly at home	77%
n/a	a lot at home, but also regularly eat out or take out	23%

Table B3

Relationship between family encouraging healthy food choices with how often participant misses or skips a meal or scheduled snack

My family encourages me to make healthy food choices.	How often do you miss or skip a meal or scheduled snack?	Percent
always	once in a while	33%
always	rarely or never	30%
always	a few times a month	23%
always	several times a week	7%
always	daily	7%
sometimes	rarely or never	45%
sometimes	a few times a month	22%
sometimes	once in a while	11%
sometimes	several times a week	22%
rarely	rarely or never	100%
n/a	rarely or never	38%
n/a	once in a while	38%
n/a	a few times a month	8%
n/a	several times a week	16%

Table B4

Relationship between family encouraging participant to make healthy food choices and how often participant eats food high in fat like fried foods, lots of butter or mayonnaise

My family encourages me to make healthy food choices.	How often do you eat foods high in fat, like fried foods, lots of butter or mayonnaise?	Percent
always	several times a week	17%
always	a few times a month	17%
always	once in a while	53%
always	rarely or never	13%
sometimes	several times a week	11%
sometimes	a few times a month	22%
sometimes	once in a while	67%
rarely	once in a while	100%
n/a	several times a week	30%
n/a	a few times a month	16%
n/a	once in a while	38%
n/a	rarely or never	16%

Table B5

Relationship between family willing to make healthy food choices along with me and how participant decides what to eat

My family is willing to make healthy food choices along with me	How do you decide what to eat?	Percent
always	other	4%
always	count carbohydrates	4%
always	avoid sweets or sugar	19%
always	count calories, avoid sweets or sugar, limit amount of fat	4%
always	follow a meal plan	11%
always	avoid sweets or sugar, limit amount of fat	30%
always	limit amount of fat, eat anything I want	4%
always	count calories, count carbohydrates, avoid sweets or sugar, limit amount of fat	4%
always	count carbohydrates, avoid sweets or sugar	4%
always	follow a meal plan, avoid sweets or sugar	4%
always	avoid sweets or sugar, limit amount of fat, other	4%
always	limit amount of fat	11%
sometimes	other	8%
sometimes	eat anything I want	25%
sometimes	count carbohydrates, avoid sweets or sugar, limit amount of fat	17%
sometimes	avoid sweets or sugar	17%
sometimes	avoid sweets or sugar, limit amount of fat	25%
sometimes	count carbohydrates, follow a meal plan	8%
n/a	follow a meal plan	14%
n/a	follow a meal plan, avoid sweets or sugar, limit amount of fat	7%
n/a	avoid sweets or sugar, limit amount of fat	21%
n/a	limit amount of fat	14%
n/a	avoid sweets or sugar, eat anything I want	7%
n/a	other	7%
n/a	avoid sweets or sugar	7%
n/a	follow a meal plan, eat anything I want	7%
n/a	eat anything I want	7%

n/a	count carbohydrates, avoid sweets or sugar, limit amount of fat	7%

Table B6

Relationship between family willing to make healthy food choices along with me and typical meal plan

My family is willing to make healthy food choices along with me.	What is your typical meal plan?	Percent
always	changes due to work schedule	4%
always	breakfast, lunch, dinner, and snacks; changes due to work schedule	4%
always	breakfast, lunch, dinner, and snacks	70%
always	breakfast, lunch, and dinner	15%
always	eat whenever I'm hungry	7%
sometimes	breakfast, lunch, dinner, and snacks	58%
sometimes	breakfast, lunch, and dinner	42%
n/a	breakfast, lunch, and dinner	43%
n/a	breakfast, lunch, dinner, and snacks; changes due to work schedule	7%
n/a	Breakfast, lunch, dinner, and snacks	36%
n/a	eat whenever I'm hungry	14%

Table B7

Relationship between family exercising with participant and typical exercise

My family exercises with me.	What is your typical exercise?	Percent
always	regular exercise program	60%
always	activities of daily living only	40%
sometimes	regular exercise program	30%
sometimes	activities of daily living only	60%
sometimes	limited due to physical problems	10%
rarely	regular exercise program	37%
rarely	activities of daily living only	42%
rarely	limited due to physical problems	21%
n/a	regular exercise program	26%
n/a	activities of daily living only	42%
n/a	limited due to physical problems	32%

Table B8

Relationship between family exercising with participant and frequency of exercise

My family exercises with me.	How often do you exercise a total of at least 20 minutes per day during a typical month?	Percent
always	daily	20%
always	several times/week	60%
always	a few times/month	20%
sometimes	daily	20%
sometimes	several times/week	60%
sometimes	a few times/month	10%
sometimes	once in a while	10%
rarely	daily	32%
rarely	several times/week	42%
rarely	a few times/month	5%
rarely	once in a while	10.5%
rarely	rarely or never	10.5%
n/a	daily	26%
n/a	several times/week	32%
n/a	a few times/month	0
n/a	once in a while	5%
n/a	rarely or never	37%

Table B9

Relationship between family exercising with participant and duration of exercise

My family exercises with me.	How long do you exercise?	Percent
always	16-30 minutes	20%
always	31-45 minutes	20%
always	46-60 minutes	40%
always	more than an hour	20%
sometimes	1-15 minutes	10%
sometimes	16-30 minutes	50%
sometimes	31-45 minutes	0
sometimes	46-60 minutes	30%
sometimes	more than an hour	10%
rarely	1-15 minutes	15%
rarely	16-30 minutes	32%
rarely	31-45 minutes	32%
rarely	46-60 minutes	5%
rarely	more than an hour	16%

Table B10

Relationship between how often family encourages participant to exercise and typical exercise

My family exercises with me.	What is your typical exercise?	Percent
always	regular exercise program	45%
always	activities of daily living only	45%
always	limited due to physical problems	10%
sometimes	regular exercise program	17%
sometimes	activities of daily living only	66%
sometimes	limited due to physical problems	17%
rarely	regular exercise program	38%
rarely	activities of daily living only	50%
rarely	limited due to physical problems	12%
n/a	regular exercise program	36%
n/a	activities of daily living only	28%
n/a	limited due to physical problems	36%

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DATE: **March 15, 2005**

FROM: Linda Rose-Krasnor, Chair
Research Ethics Board (REB)

TO: Joe Engemann, Education
Hanet TAN

FILE: **04-308 - TAN**

TITLE: **Examining the Influence of Family Support on Diabetes Education Behavioural Outcomes**

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: **Accepted as Clarified**

This project has received ethics clearance for the period of **March 15, 2005** to **September 01, 2005** subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance may be extended upon request. ***The study may now proceed.***

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written approval from the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to http://www.brocku.ca/researchservices/forms to complete the appropriate form **Revision or Modification to an Ongoing Application.**

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council. Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form ***Continuing Review/Final Report*** is required.

Please quote your REB file number on all future correspondence.